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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/579,000

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Alexander Apolonski

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EXAMINER

HAGAN, SEAN P

ART UNIT

PAPER NUMBER

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DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/579,000	Applicant(s) APOLONSKI ET AL.	
	Examiner SEAN HAGAN	Art Unit 2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 April 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 12 and 14-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 12 and 14-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1 through 11 originally filed 11 May 2006. Claims 1 through 11 amended by amendment received 11 May 2006. Claims 1 through 11 cancelled by amendment received 14 January 2008. Claims 12 through 20 added by amendment received 14 January 2008. Claim 13 cancelled by amendment received 3 October 2008. Claim 21 added by amendment received 3 October 2008. Claims 12, 14, 15, 17, and 18 amended by amendment received 3 October 2008. Claims 12 and 14 amended by amendment received 17 April 2009. Claims 12 and 14 through 21 are pending in this application.

Response to Arguments

2. Applicant's arguments have been fully considered; they are persuasive. New art has been located.

3. Applicants argue that Cho et al. ("Generation of 90-nJ pulses with a 4-MHz repetition-rate Kerr-lens mode-locked Ti:Al₂O₃ laser operating with net positive and negative intracavity dispersion," Opt. Lett. 26, 560-562 (2001), hereafter Cho) utilizes prisms for dispersion compensation which can not provide the dispersion value claimed and combination with Szipocs et al. (Szipocs, US Patent 5,734,503) would not motivate one of ordinary skill in the art to operate within the claimed regime. Cho does not explore the option of dispersive mirrors despite the reference being published after the invention thereof. This does not, however, mean Szipocs was not in possession of

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dispersive mirrors that would advantageously improve Cho. Why Cho did not explore that option is a moot point open for speculation. Never the less, Szipocs still provides that dispersive mirrors were known in the art at the time of invention and provides motivation for their introduction in dispersion compensation systems. This, however, does not provide any motivation for operating at a low positive dispersion.

4. Cho provides a very high positive GDD which is outside the claimed range and Szipocs utilizes a low negative GDD. Szipocs does not appear to require the low negative GDD and would appear to operate in a system with any given positive GDD, but there appears sufficient difference in the features of a low positive GDD that operation at a negative GDD or operation at a high positive GDD would not, alone or in combination, motivate one to operate at a low positive GDD. As such, new art has been located to provide information on operation in a regime of low positive GDD. Though Cho alone would appear incapable of operating in this regime, Szipocs appears to rectify this deficiency, thus provision of information on the claimed range causes the combination of Cho and Szipocs to read upon the claimed invention.

5. As such, all claims are addressed as follows:

Claim Rejections - 35 USC § 103

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

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7. Claims 12, 14, 15, 16, 18, 19, 20, and 21 rejected under 35 U.S.C. 103(a) as being unpatentable over Cho et al. ("Generation of 90-nJ pulses with a 4-MHz repetition-rate Kerr-lens mode-locked Ti:Al₂O₃ laser operating with net positive and negative intracavity dispersion," Opt. Lett. 26, 560-562 (2001), hereafter Cho) in view of Szipocs et al. (Szipocs, US Patent 5,734,503) and further in view of Proctor et al. ("Characterization of a Kerr-lens mode-locked Ti:sapphire laser with positive group-velocity dispersion" Opt. Lett. 18, 1654-1656 (1993), hereafter Proctor).

8. Proctor was provided in IDS received 1 August 2008.

9. **Regarding claim 12**, Cho discloses, "A resonator comprising resonator components including a laser crystal" (Fig. 1). "A plurality of mirrors including a pump beam coupling-in mirror" (Fig. 1). "A laser beam out-coupling mirror and a multiple reflection telescope for enlarging the resonator length" (Fig. 1). "A first set of the resonator components having a positive group delay dispersion" (pg. 561, col. 2, starting "Using positive dispersion mode locking..."). "Said resonator in operation having a positive net averaged group delay dispersion over an operating wavelength range" (pg. 561, col. 2, starting "Using positive dispersion mode locking..."). Cho does not disclose, "Said plurality of mirrors including dispersive mirrors with a negative group delay dispersion for compensating in part the positive group delay dispersion of the first set of the resonator components." Szipocs discloses, "Said plurality of mirrors including dispersive mirrors with a negative group delay dispersion for compensating in part the positive group delay dispersion of the first set of the resonator components" (col. 3, lines

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51-65). It would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of Cho with the teachings of Szipocs. The use of dispersive mirrors as disclosed by Szipocs would enhance the teachings of Cho by introducing more stable dispersive elements (Szipocs, col. 3, lines 51-65).

10. The combination of Cho and Szipocs does not disclose, "Wherein the positive net averaged group delay dispersion of the resonator is in a range between 0 and 100 fs²." Proctor discloses, "Wherein the positive net averaged group delay dispersion of the resonator is in a range between 0 and 100 fs²" (pg. 1655, col. 1, starting "Spectrum a in Fig. 1..."). It would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of the combination of Cho and Szipocs with the teachings of Proctor. Operation within the ranges disclosed by Proctor would enhance the teachings of Cho and Szipocs by providing information on what bandwidths are available through positive dispersion and, thus, introduce operational parameters not otherwise available. (Proctor, Fig. 1)

11. **Regarding claim 14**, the combination of Cho and Szipocs does not disclose, "Wherein the positive net averaged group delay dispersion is <50 fs²." Proctor discloses, "Wherein the positive net averaged group delay dispersion is <50 fs²" (pg. 1655, col. 1, starting "Spectrum a in Fig. 1..."). It would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of the combination of Cho and Szipocs with the teachings of Proctor for the reasons given above regarding claim 1.

12. **Regarding claim 15**, Cho does not disclose, "Wherein the multiple reflection telescope comprises at least one of the dispersive mirrors with the negative dispersion." Szipocs discloses, "Wherein the multiple reflection telescope comprises at least one of the dispersive mirrors with the negative dispersion" (col. 3, lines 51-65). It would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of Cho with the teachings of Szipocs for the reasons given above regarding claim 1.

13. **Regarding claim 16**, Cho does not disclose, "Wherein all the mirrors of the resonator are the dispersive mirrors with the negative dispersion." Szipocs discloses, "Wherein all the mirrors of the resonator are the dispersive mirrors with the negative dispersion" (col. 3, lines 51-65). It would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of Cho with the teachings of Szipocs for the reasons given above regarding claim 1.

14. **Regarding claim 18**, Cho discloses, "Wherein the laser arrangement is configured to provide passive mode-locking" (pg. 560, col. 1, starting "In this Letter...").

15. **Regarding claim 19**, Cho discloses, "Wherein a Kerr-lens mode-locking principle is used for the passive mode-locking" (pg. 560, col. 1, starting "In this Letter...").

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16. **Regarding claim 20**, Cho discloses, "A saturable absorber positioned and configured to perform the passive mode-locking" (pg. 560, col. 1, starting "In this Letter...").

17. **Regarding claim 21**, Cho does not disclose, "Wherein an entirety of the negative dispersion of the resonator is determined only by the dispersive mirrors with the negative dispersion." Szipocs discloses, "Wherein an entirety of the negative dispersion of the resonator is determined only by the dispersive mirrors with the negative dispersion" (col. 5, lines 12-16). It would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of Cho with the teachings of Szipocs for the reasons given above regarding claim 1.

18. Claim 17 rejected under 35 U.S.C. 103(a) as being unpatentable over Cho in view of Szipocs in view of Proctor and further in view of Cunningham et al. (Cunningham, US Patent 5,701,327).

19. **Regarding claim 17**, the combination of Cho, Szipocs, and Proctor does not disclose, "The resonator comprising a pair of glass wedges with positive dispersion configured to provide a supplementary dispersion fine adjustment." Cunningham discloses, "The resonator comprising a pair of glass wedges with positive dispersion configured to provide a supplementary dispersion fine adjustment" (col. 6, lines 42-44). It would have been obvious to one of ordinary skill in the art at the time of invention to

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combine the teachings of the combination of Cho, Szipocs, and Proctor with the teachings of Cunningham. Inclusion of wedges for fine tuning pulse characteristics as taught by Cunningham would enhance the teachings of Cho and Szipocs by allowing for introduction of minute alterations of dispersion should such alterations present themselves as necessary.

Conclusion

20. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

21. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to SEAN HAGAN whose telephone number is (571)270-1242. The examiner can normally be reached on Monday-Friday 7:30 - 5:00.

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23. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun O. Harvey can be reached on 571-272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

24. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. H./

Examiner, Art Unit 2828

/Minsun Harvey/

Supervisory Patent Examiner, Art Unit 2828